



# CALIFORNIA INSTITUTE OF TECHNOLOGY

DIVISION OF PHYSICS, MATHEMATICS, AND ASTRONOMY  
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March 22, 2016

Office of Mauna Kea Management  
Attn: Stephanie Nagata, Director  
640 N. A'ohōkū Place, Room 203

Re: Notice of Intent to Decommission  
Caltech Submillimeter Observatory  
Site Survey

Dear Ms. Nagata,

On November 18, 2015, the Provost of the California Institute of Technology submitted to your office a Notice of Intent to Decommission the Caltech Submillimeter Observatory located on Maunakea, in accordance with the *Decommissioning Plan for the Mauna Kea Observatories*, a sub-plan of the *Mauna Kea Comprehensive Management Plan*.

We hereby submit, as an addendum to the above Notice of Intent, an updated site plan, as required by the *Decommissioning Plan*. The development of the site plan was undertaken on behalf of Caltech by dlb & Associates, Kea'au, HI 96749, in cooperation with our staff. In addition to the survey data acquired by this firm, the site plan incorporates historical data provided by CSO. The updated site plan is included as an attachment to this letter. An electronic version (include a .DWG file of the site plan) will be transmitted electronically to your office.

Sincerely,

A handwritten signature in black ink, appearing to read 'Sunil Golwala'.

Sunil Golwala  
Professor of Physics  
California Institute of Technology  
Director, Caltech Submillimeter Observatory

## Report

March 1, 2016

**To:** California Institute of Technology  
Purchasing Services, Attn. Sheri Stoll  
1200 E. California Blvd.  
Mail Code 103-6  
Pasadena, CA. 91125

Caltech Subm. Observatory  
Attn.: Simon Radford  
111 Nowelo St.  
Hilo, HI., 96720

**Re: Caltech Submillimeter Observatory**  
TMK (3) 4-4-015:009 (portion)  
Mauna Kea Science Reserve,  
Kaohe, Hamakua, Island & Co. of Hawaii, Hawaii

This report summarizes methods of topographic survey completed November 24 2015 at Caltech Submillimeter Observatory at Mauna Kea summit.

## Methods

Office preparation consisted of delivery of historical construction plans (dated Feb., 1983) and a lease area diagram. The original lease boundary appears to be referenced to NAD27, Hawaii State Plane coordinates, which was superseded by NAD83 projection.

The current topographic survey used static GPS observations at a control point near the site (station 101) to establish coordinates. Observations to CORS stations yields coordinate value on NAD 83, Hawaii State Plane Zone 1 (PA11) 2010.00 Epoch. This is the reference frame. GPS vectors were processed using NGS OPUS service. CORS stations used are:

1. Mauna Kea CORS ARP (PID: DE6589)
2. Mauna Loa Observ CORS (PID: DG9765)
3. Honolulu WAAS1 CORS ARP (PID: DF8972)

Geographic coordinates and residuals ( ) at control station 101 are:

Lat. N 19°49'22.27469" (0.010 m); Lon. W 155°28'31.20801" (0.027 m); Elev. 4075.299m (0.064 M)

Finally, Lat./Lon. were converted to North/East grid plane coordinates in US Survey Feet units.

Topographic survey data was acquired using GPS RTK methods in an assumed Hawaii state plan projection. The data was translated to the CORS derived coordinates at Sta. 101 and expanded from grid (raw meas.) to ground. Therefore the only true state plane coord value is at Sta. 101.

Diligent search of lease boundary evidence yielded only 1 found monument. The lease area was inserted at this location, oriented to grid azimuth. Contouring/drafting was completed in CAD software. Electronic files delivered to Simon Radford at the Hilo office of CSO



## Archived Plans

As above, historical construction plans (dated Feb., 1983) were provided to this office. At request of CalTech, certain underground utilities were included as a revision February 2016.

Image files were inserted into cad, aligned to observatory footprint or lease boundary, and digitally traced. Following features were included:

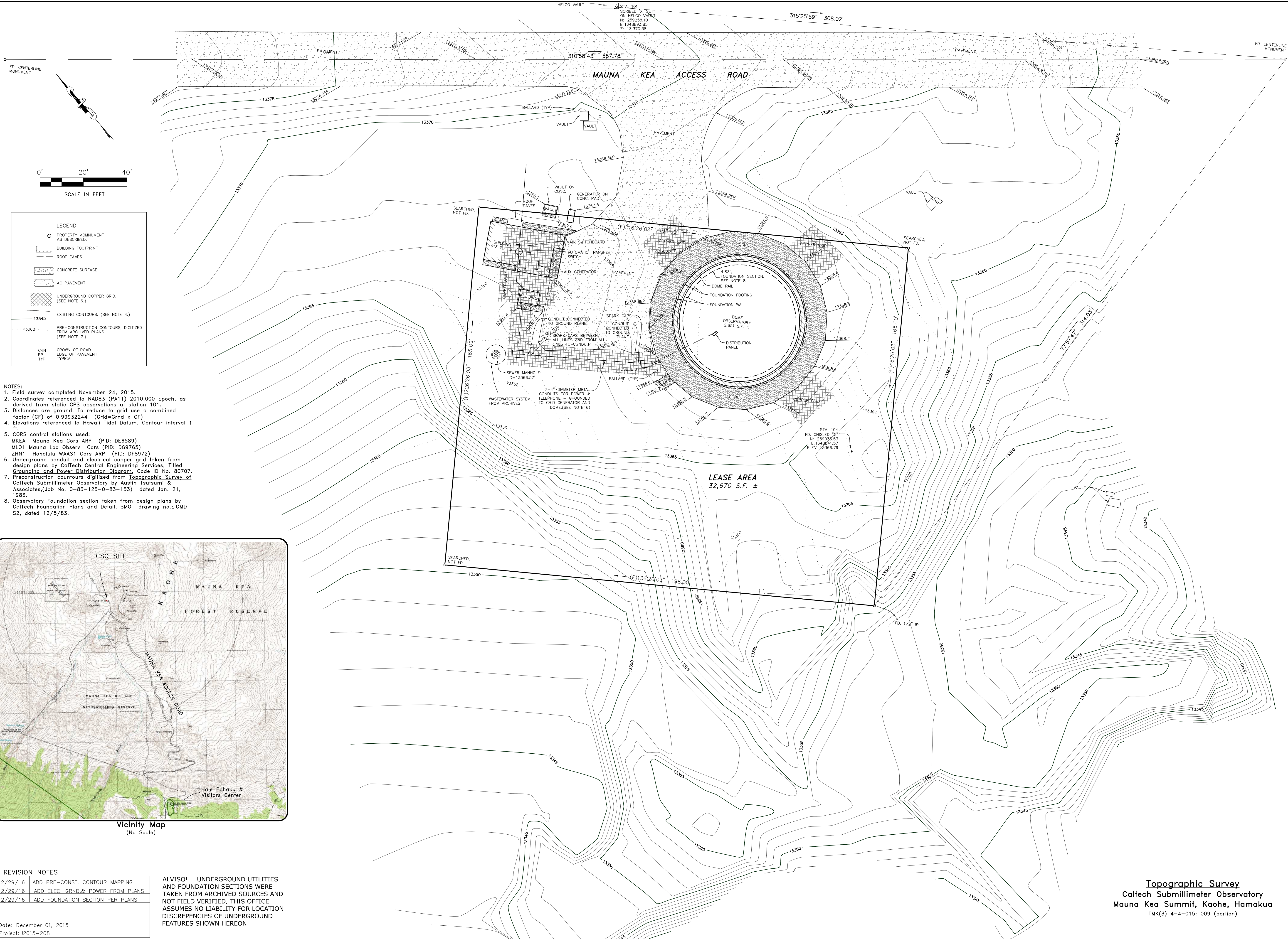
- Underground electrical conduit, power distribution panel, underground copper ground grid were taken from plans entitled Grounding and Power Distribution Diagram. Code id 80707 Being a diagram, exact location may not follow the alignment shown on the plans. No dimensions are specified for these features. (Note 6 on topo survey.)
- Preconstruction contours were taken from a topographic survey by Austin, Tsutsumi & Associates, dated Jan. 21, 1983 (Job No. 0-83-125-0-83-153.) The raster pdf is of poor quality, but contours were traced as best possible. Contour interval varies. The Austin Tsutsumi plan includes breaklines and spot elevations. The correct method to produce the original surface is to digitize breaklines and spot elevations and create a 1983 era TIN model. Such a task is beyond the scope of this survey. (Note 7 on topo survey.)
- The observatory structural foundation and rail was taken from Foundation Plans and Detail, Submillimeter Observatory, drawing no. EIOMD S2 dated 12/5/83. The foundation wall was measured at exterior. Detail 1/S2 and 3/S2 per plans indicate a foundation thickness up to 4.83 ft. (4'10") and 5 ft. below grade. These values were not field verified. (Note 8 on topo survey.)

Underground features were taken from archived sources provided by others. Field verification by potholing or probing was not a part of the scope of work and not conducted. dlb and associates assumes no liability for variance of location, depth or material of underground features shown on the revised topographic survey dated February 29, 2016.

This report was prepared by  
me or under my direction.

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Daniel L. Berg  
PLS 11245 (HI)



This work was prepared by me or under my direct supervision.

Daniel L. Berg  
PLS 11245